10th CLASS-PHYSICAL SCIENCE

REFRACTION OF LIGHT AT CURVED SURFACES

½ Mark Questions

1.What happens to a ray that travels along the principal axis strikes a convex surface and passes from rarer to denser medium?

2.What happens to a ray that travels through the centre of curvature strikes a concave surface and passes from denser to rarer medium ?

3.What happens to a ray after refraction with respect to principal axis that traveling parallel to the principal axis strikes a convex surface and passes from rarer medium to denser medium?

4.What happens to the refracted ray when a ray travelling parallel to the principal axis strikes a concave surface and passes from rarer medium to denser medium ?

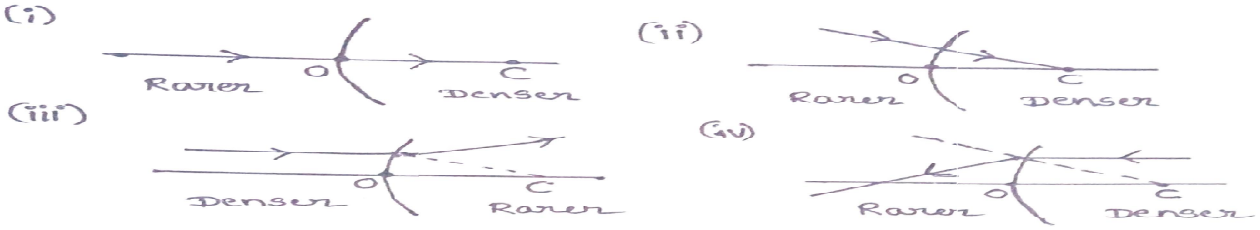
5. **Assertion(A):** A ray that traveling parallel to the principal axis strikes a concave surface and passes from denser medium to rarer medium reaches a particular point on the principal Axis after refraction

Reason(R): The refracted ray bends away from the normal when a ray of light travels from denser to rarer medium.

Which of the following is statement?

A) Both A and R are correct, R is not correct explanation of A
B) Both A and R are correct, R is correct explanation of A
C) A is correct and R is incorrect
D) A is incorrect and R is correct

6.Trace out the correct diagrams from the following



A)(i),(ii) and(iii) B) (i) and (ii) C) (iv) only D) (i),(ii),(iii) and (iv)

7. A curved surface of radius of curvature R is separating the two media of refractive indices n_1 and n_2 .If u and v are object and image distances respectively. Write the equation to show the relation among them?

8. A plane surface is separating the two media of refractive indices n_1 and n_2. If u and v are object and image distances respectively. Write the equation to show the relation among them ?

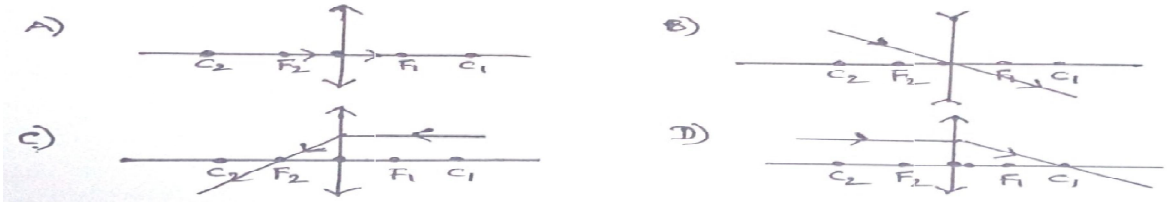
9. A bird is flying down vertically towards the surface of water in a pond with a constant speed. Actual height of a bird is 'x '.The bird appear at the height 'y' to the fish inside the water, refractive index of water is n. Write the relation among x,y and n ?

10.Name the lens which is bounded by two spherical surfaces, thin at the middle and thicker at the edges?

11.Choose the suitable answers of section B with section A

Section A		Section B
i)The line joining the centre of curvature of a lens	( )	P) Focal length
ii)The distance between the focal point and optic centre	( )	Q) Radius of curvature
iii) Concave lens	( )	R) Principal axis
		S) ↕
		T)

12.Which of the following ray diagram is correct?



13.What happens when parallel rays of light fall on lens making some angle with principal axis?

14.Choose the suitable answers of section B with section A.When the object is placed on the principal axis of convex lens

Section A **Position of the Object**		**Section B** **Position of the Image**
1) At infinity	( )	P) At infinity
2) Beyond centre of curvature	( )	Q) At centre of curvature
3) At the centre of curvature	( )	R) Between focus and centre of curvature
4) At focus	( )	S) At focus

15.Where should an object be placed in order to use a convex lens as a magnifying glass.

16. **P:** A real,inverted and the same size of image is formed by a convex lens when the object is placed at centre of curvature
Q: A real,inverted and diminished image is formed by a convex lens when the object is placed between focus and centre of curvature
R: A real,erect and magnified image is formed by convex lens when the object is placed between focus and optical centre
Which of the statement is correct?

17.Write the characterstics of an image formed by a concave lens when the object is placed in front of it ?

18.Choose the correct answers of section B with section A

Section A	**Section B**
1) Lens formula	P) Depends upon the surrounding medium
2) Lens maker's formula	Q) Does not depend upon the surroundings
3) Focal length of the lens	R) $1/f=1/v-1/u$
	S) $1/f=1/u-1/v$
	T) $1/f=(n-1)[1/R_1-1/R_2]$

19. **X:** The convex lens behaves as a converging lens if it is kept in a medium with refractive index less than the refractive index of the lens
Y: The convex lens behaves as a diverging lens if it is kept in a medium with refractive index more than the refractive index of the lens
Which of the above statement is correct?

20.What happens to the focal length of the convex lens when it is kept in water?

21.A double convex lens has two surfaces of equal radii 'R' and refractive index n=1.5 Find the focal length of the lens

22.Find the focal length of the Plano- convex lens when its radius of curvature is 'R' and' n' is the refractive index of the lens?

23. Suppose you are inside the water in a swimming pool near an edge. A friend is standing on the edge.Do you find your friend taller or shorter than the actual height?

24. How many images are formed by a lens when it is made up of three different materials

25.Find the object distance, if the image distance of convex lens of focal length 25 cm is 75 cm

26.Why does an air bubble in water behaves like a diverging lens

27.Among the following cases the image formed by a convex lens is real?
A) $f<u<2f$ B)$2f<u<\infty$ C) af 2f D)$0<u<f$

28.Find the focal length of the Plano convex lens when its radius of curvature is R and n is refractive index of the lens

29.The focal length of the Plano convex lens is 2R. It's radius of curvature is R. Find the refractive index of the material used?

30. **Assertion(A):** A person standing on the land appears taller than his actual height to a fish inside a pond
Reason(R): Light bends away from the normal as it's enters from water
Which of the following statement is correct?
A) A and R are correct, R is correct explanation of A
B) A and R are correct, R is not correct expression of A
C) A is true but R is false
D) A is false but R is true

31.Where do we place an object in front of convex lens in order to get virtual,erect and magnified image?

32.In which situation, the value of focal length of convex lens is equal to the value of image distance.

33. What is the distance between object and image, when object is kept in the front of convex lens at centre of curvature

34.Which lens is used to always get diminished and virtual image?
35.Choose the correct statement
A)The distance of virtual image is always greater than the object distance for convex lens.
B)The distance of virtual image is always less than the object distance for convex lens.
C)Convex lens always forms a real image.
D)Concave lens always forms a real image.
36.Choose the incorrect statement
A)A ray that travels through the centre of curvature is not deviated.
B)The midpoint of a lens is called optic centre
C)Every lens has two radii of curvature.
D)All distances are measured from the optic centre.
37. Which is not len's formula
A)2/R=1/v+1/u B)1/f=1/v-1/u C)2/R=1/v-1/u D)f=uv/u-v
38.If the focal length of the lens is **-**20cm, then what is minus indicates?
39.You have a lens, it is spherical surfaces bulging outwards and thick at middle as compared to edges. According to this statement, identify the correct lens?
Bi-convex lens, Bi-concave lens, Plano-convex lens, Plano-concave lens
40.Which lens is called as divergent lens?

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KEY

1. Undeviated from its path
2. Undeviated from its path
3. Retraced ray moves towards the principle axis
4. Retraced ray moves away from the principle axis
5. B
6. D
7. $n_2/v-n_1/u=(n_2-n_1)/R$
8. $n_2/v-n_1/u=0$ (or) $n_2/v=n_1/u$
9. y=nx
10. Bi-concave lens
11. i→R, ii→P, iii→T
12. A,B and C
13. The ray converges at a point (or) appear to diverges from a point on the focal plane after refraction
14. 1→S, 2→R, 3→Q, 4→P
15. Between Optic centre and focus
16. P and R
17. Virtual, Erect and Diminished
18. 1→R, 2→T, 3→P
19. X and Y
20. Increases
21. R
22. R/(n-1)
23. Taller
24. 3
25. 37.5cm
26. R.I of water is more than the air bubble
27. A,B and C
28. R/(1-n)
29. 1.5
30. A
31. Between optic centre and focus (or) Between O and F
32. Object at infinite distance
33. 2R
34. Concave lens
35. A
36. C
37. A
38. Divergent lens
39. Bi-convex lens
40. Concave lens